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ML Directorate helps search for Lewis and Clark artifacts

by Timothy R. Anderl, Materials and Manufacturing Directorate

TYNDALL AFB, Fla. — Air Force Research Laboratory Materials and Manufacturing Directorate experts are helping a group of modern-day explorers search for a long-lost artifact from Lewis and Clark's historic two-year expedition.

Their goal is to find Capt Meriwether Lewis' iron boat frame, a nationally significant artifact representing an important milestone in the history of the United States.

This team of experts from the robotics sensor group of the directorate's air expeditionary forces branch surveyed 30 acres at the suspected burial site near Great Falls, Mont., Sept. 11-14, using state-of-the-art sensor and robotics equipment.

Walt Waltz, a program manager for robotics research within the directorate, said two robotic platforms, the group's Autonomous Mobility Research and Development System and the University of Florida's Mule, a four-wheeler with a technology navigation system, were used to tow two Electromagnetic Model 61 sensor coils. These coils, which are ground penetrating sensor systems, were used during the subsurface search of the area.

Waltz said the group deployed an additional sensor to the search site as a back up.

"In 1993, the Army Environmental Center funded our robotics research and development of an autonomous system that would allow them to survey an area for unexploded ordnances," Waltz said. "One of the towed sensors was the EM-61, capable of detecting objects several feet underground. When this survey opportunity came about, we immediately identified the system to accomplish this mission.

"Three onsite contractors from our group are running both of the systems," he said. "They visited the area before the trip and described it as 'very flat.' Given the ease of surveying flat terrain, they knew they could provide collaborators with the location of the boat frame in a few weeks."

Waltz said the sensor software program the team used identified multiple targets as it surveyed the area. The robotics team sent the information they collected to the sensor manufacturer who will use the latest software techniques to read the data and narrow it down. When the manufacturer completes the data reduction, Waltz said his team would compile it in a report, which will help archeologists choose where to dig.

Archaeologists involved in the project indicated that members of the Lewis and Clark expedition buried the boat frame, made of 200 pounds of iron, six to 12 feet below the surface.

Due to the dry Great Falls area climate, the archaeologists estimate that only 20 to 40 percent of the iron was lost due to oxidation during the last 200 years.

The Autonomous Mobility Research and Development System (AMRADS).

The expedition that inspired this project began in 1803 when Thomas Jefferson received congressional approval to send a small U.S. Army Unit to explore the Missouri and Columbia Rivers. Jefferson wanted to know whether Americans could follow the two rivers overland to the Pacific Ocean from the Rocky Mountains.

Jefferson expected this would provide American traders with a superior transportation route to help them compete with British fur companies who ventured south from Canada.

In the summer of 1805, Lewis, Clark and the Corps of Discovery reached a point where the Missouri River seemed to divide equally into northern and southern branches. Historical reports indicate that the team thought the south branch was the true Missouri River, so they scouted ahead with a small advance party and set up camp around present-day Great Falls.

Before Lewis and Clark's expedition, Lewis commissioned the building of an iron boat frame, which they had brought along on their expedition. While at their camp, they stretched animal hides across the metal framework to make a lightweight boat and resume their journey on the river.

The plan failed when stitches in the hides began to leak. After days of frustration, they buried the boat frame and continued their journey.

"I therefore relinquished all further hope of my favorite boat and ordered her to be sunk in the water, that the skins

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might become soft in order the better to take her in [pieces] tomorrow and deposited the iron [frame] at this place as it could probably be of no further service to us," Capt Lewis wrote in his journal on July 9, 1805. "[But,] it was now too late to introduce a [remedy] and I bid adieu to my boat, and her expected services."

Though Lewis and Clark did not ultimately find the easy connection between the Missouri and Columbia Rivers that Jefferson had hoped for, the expedition yielded detailed reports on western geography, Native American customs and languages, animals, plants and climates. **@**